

of analysis itself, as the specimens of what, in the hands of Dr. Prout, it has already performed: and not doubting, but that by the exertion of such talents, such ingenuity, and such labour, their satisfaction will from year to year be continually increased.

*On delivering the Copley Medal to Lieutenant HENRY FOSTER.*

Of all the accidental discoveries ever made by man, the most unexpected and extraordinary, as well as most useful in its consequences, appears to have been the magnetic needle. No one could have thought it within the range of possibility to devise any plan, by means of which a ship in the midst of a wide ocean, surrounded with perfect darkness, and tossed by the winds and by the waves, might yet be able to ascertain its course with the same certainty as in open day, and under circumstances the most favourable. Yet the simple experiment of a child floating a magnetized needle on a cork, directly led to this important discovery. The variation must, without doubt, have been immediately observed. Columbus is said to have first noticed, and with astonishment and dismay, that the variation increased as he proceeded on his great voyage of discovery towards the West. Magnetism, a subject at once so curious and so useful, was attended to with such care, that the secular change of variation in the same place did not long escape notice. The dip was early known; and more than a century ago observations were made on the daily change of direction, and on a supposed relation which it bore to the appearance of northern lights, and to other natural phænomena. Nor were theories wanting:—some utterly gratuitous, as that conjectured by the celebrated Dr. Halley, who supposed arbitrary points of attraction, and an internal earth or revolving nucleus. Other theories, although given by less eminent men, appear to be more conformable to the true principles of generalizing by induction; as that quoted by Mr. Foster, from Derham in his *Physico-theology*. But the accuracy of modern experiment was wanting. The method of counting vibrations to ascertain intensity had not then occurred; nor were instruments, in all probability, to be procured that were accurately made, or of much delicacy of motion. In recent times, and by a member of this Society\*, we have seen the local attraction of ships compensated on the most scientific principles; terrestrial direction neutralized; and the line of action, at least of diurnal variation, ascertained.

And we have seen phænomena little less astonishing than

\* Mr. Barlow.

the one displayed by the original discovery of magnetism itself, in the connection that it bears to electricity and in the induction from rotary motion. It was important, however, that experiments should be repeated in different places, and especially in those which are most difficult of access, but situated near to the magnetic pole.

Lieutenant Henry Foster, well known to this Society by the cooperation he afforded to Captain Basil Hall in determining the number of vibrations made by an invariable pendulum near the equator, and at several other stations; having shared in the dangers of Captain Parry's second voyage, eagerly seized the opportunity afforded by a winter residence at Port Bowen, on the eastern side of Prince Regent's Inlet, in lat.  $73^{\circ} 14'$ , to ascertain the rate of an invariable pendulum, to conduct an elaborate course of experiments on magnetism; and in addition to these, observations on refraction.

One is utterly astonished at the magnitude of these labours, and at the accuracy and care with which they were conducted, (as is manifest from internal evidence,) in a situation where comfort and ease were unattainable, and where peculiar difficulties presented themselves at every step. It is impossible for me to give an abstract of Mr. Foster's most ample and detailed communication: I must refer every scientific inquirer to the paper itself. Among its important contents are:—The amount and times of daily variation attributable of course to the sun, but including in one series the action apparently caused by the moon.—The line on which a needle being directed the daily variation ceases.—A refutation of the supposed connection between tremors of the needle and aurora borealis.—The amount and times of daily variation in the dip; with a deduction from thence, according to the known law of the cosines, to the periodical change in horizontal intensity.—And a legitimate conclusion from all these facts, that the magnetic axis of the earth may probably describe a small curve, compounded of circles attributable to the sun and moon, of two or three minutes' radius round its mean place, which will solve the change of dip, of diurnal variation and of horizontal intensity; and may account for the secular variation in a manner similar to that which explains the precession of the equinox.

The Royal Society are of opinion that they do no more than strict justice, in awarding their Copley medal to the author of these observations and deductions; and not without a hope that by so doing, public attention may be more strongly drawn towards an officer possessing such abilities, energies, and perseverance\*.

\* Never were expectations more speedily or more amply gratified; for  
on



After the delivery of the Medals, the Society proceeded to the election of a Council and Officers for the year ensuing; when on examining the lists, the following was found to be the state of the ballot:

Members of the old Council to continue.—Davies Gilbert, Esq. M.P. Capt. Francis Beaufort, R.N.; John George Children, Esq.; Sir Humphry Davy, Bart.; John F. W. Herschel, Esq. M.A.; Sir Everard Home, Bart. V.P.; Capt. Henry Kater, V.P.; John Pond, Esq. A.R.; William Prout, M.D.; William Hyde Wollaston, M.D. V.P.; Thomas Young, M.D. Foreign Sec.

Members of the Society chosen into the Council.—Francis Baily, Esq.; The Rev. William Buckland, D.D.; Charles Lord Colchester; John Wilson Croker, Esq.; William Henry Fitton, M.D.; The Rev. Edmund Goodenough, D.D.; John Guillemaud, Esq.; John Ayrton Paris, M.D.; Peter Mark Roget, M.D.; Capt. Edward Sabine, Roy. Art.

Officers for the ensuing year:

*President*: Davies Gilbert, Esq. M.P.—*Treasurer*: Capt. Henry Kater.—*Secretaries*: Peter Mark Roget, M.D.; Capt. Edw. Sabine.

#### ASTRONOMICAL SOCIETY.

Nov. 9.—Mr. Baily presented a paper. “On the right ascension of  $\gamma$  Cassiopeæ.” As this paper is a short one, and of an interesting nature we shall give it nearly in the words of the author:

“On comparing the Catalogue of Stars, recently published by this Society, with the Catalogue of 100 principal fixed stars given by Mr. Pond, at the end of the Nautical Almanac for 1829, I was struck (he says) with the considerable difference which appears in the  $R$  of  $\gamma$  Cassiopeæ: Mr. Pond making the  $R$  of that star upwards of one second (in time) more than the Catalogue printed by this Society. At first I imagined that some error might have crept into the calculations of the Society’s Catalogue, notwithstanding they were made by two computers, independent of each other, and afterwards revised by our indefatigable secretary, Mr. Stratford. I therefore, for my own satisfaction, went through the whole computations myself, and was pleased to find that there was not the slightest difference in the results. I next reduced the whole of the observations of that star made by Mr. Pond at the Royal Observatory at Greenwich, and found them to agree very nearly with the result, deduced by Mr. Taylor, who makes the mean of 10 observations to be  $= 0^h 46^m 13^s.23$  reduced to Jan<sup>y</sup>. 1, 1825: whereas the Society’s Catalogue gives only  $0^h 46^m 12^s.13$  on January 1, 1825; being a difference, as already stated, of  $1^s.1$ . Bradley has

on the very day that the medal was delivered, His Royal Highness the Lord High Admiral was graciously pleased to advance Mr. Foster to the situation of a commander, and to assign him a ship for a voyage of scientific investigations in the Southern hemisphere.